

## CLAIMS:

What is claimed is:

- 1 A method for filtering a servo signal in a tape drive, wherein said tape drive comprises a servo controller for track following on a tape, where said method comprises the steps of:
  - obtaining said servo signal;
  - determining a tape velocity;
  - selecting digital filter coefficients that depend upon said tape velocity; and
  - filtering said servo signal using said digital filter coefficients in a digital filter to produce a filtered servo signal.
- 2 The method of claim 1, comprising the additional step of:
  - said servo controller deriving a position error signal from said filtered servo signal.
- 3 The method of claim 1, comprising the additional steps of:
  - said servo controller deriving a position error signal from said filtered servo signal; and
  - said servo controller using said position error signal to control the position of a tape head relative to said tape.
- 4 The method of claim 1, comprising the additional steps of:
  - disabling said digital filter during deceleration of said tape.
- 5 The method of claim 1, comprising the additional steps of:
  - disabling said digital filter during acceleration of said tape.
- 6 The method of claim 1, wherein the selecting step comprises the additional step of:
  - selecting said digital filter coefficients that provide a matched digital filter for said tape velocity.
- 7 The method of claim 1, wherein the selecting step comprises the additional steps of:
  - operating said tape drive at a specified tape velocity;
  - processing said servo signal to obtain an average servo signal;
  - determining the values of said digital filter coefficients by sampling a portion of said average servo signal at equally spaced intervals to provide a matched digital filter for said specified tape velocity.
- 8 The method of claim 7, wherein the processing step comprises the additional steps of:

- obtaining an average value of the separation between a positive peak and a negative peak of said servo signal;
  - obtaining an average value of a period of said servo signal;
  - obtaining an average value of a width of said positive peak of said servo signal;
  - determining a lorentzian approximation to said servo signal using said average value of the separation between a positive peak and a negative peak, said average value of a width of said positive peaks and said average value of a period; and
  - using said lorentzian approximation to said servo signal as said average servo signal.
- 9 The method of claim 1, comprising the additional steps of:
- determining a tape direction;
  - selecting said digital filter coefficients that depend upon said tape direction.
- 10 A system for controlling a position of a tape head relative to a tape comprising:
- an actuator for moving said tape head;
  - a servo controller for controlling said actuator, comprising:
    - a servo sensor for obtaining said servo signal;
    - a tape velocity sensor for measuring a tape velocity;
    - a processing element coupled to said velocity sensor, wherein said processing element selects digital filter coefficients that depend upon said tape velocity; and
    - a digital filter coupled to said processing element, wherein said digital filter filters said servo signal using said digital filter coefficients to produce a filtered servo signal.
- 11 The system of claim 10, wherein said servo controller derives a position error signal from said filtered servo signal.
- 12 The system of claim 10, wherein said servo controller derives a position error signal from said filtered servo signal and said servo controller uses said position error signal to control said position of said tape head relative to said tape.
- 13 The system of claim 10, wherein said digital filter is disabled during deceleration of said tape.
- 14 The system of claim 10, wherein said digital filter coefficients provide a matched digital filter for said tape velocity.
- 15 The system of claim 10, further comprising;

- a tape direction sensor, wherein said digital filter coefficients depend upon a tape direction obtained from said tape direction sensor.
- 16 The system of claim 10, wherein said system is an automated data storage library further comprising a least one tape drive.
- 17 A servo controller for track following on a tape, comprising:
- a servo sensor for obtaining a servo signal;
  - a tape velocity sensor for measuring a tape velocity;
  - a processing element coupled to said velocity sensor, wherein said processing element selects digital filter coefficients that depend upon said tape velocity; and
  - a digital filter coupled to said processing element, wherein said digital filter filters said servo signal using said digital filter coefficients to produce a filtered servo signal.
- 18 The servo controller of claim 17, wherein said servo controller derives a position error signal from said filtered servo signal.
- 19 The servo controller of claim 17, wherein said servo controller derives a position error signal from said filtered servo signal and said servo controller uses said position error signal to control a position of a tape head relative to said tape.
- 20 The servo controller of claim 17, wherein said digital filter coefficients provide a matched digital filter for said tape velocity.
- 21 The servo controller of claim 17, wherein said digital filter is disabled during deceleration of said tape.
- 22 A tape drive comprising:
- a tape head;
  - an actuator for moving said tape head;
  - a servo controller for controlling said actuator comprising:
    - a servo sensor for obtaining a servo signal;
    - a tape velocity sensor for measuring a tape velocity;
    - a processing element coupled to said velocity sensor, wherein said processing element selects digital filter coefficients that depend upon said tape velocity; and

a digital filter coupled to said processing element, wherein said digital filter filters said servo signal using said digital filter coefficients to produce a filtered servo signal.

- 23 The tape drive of claim 22, wherein said digital filter coefficients provide a matched digital filter for said tape velocity.
- 24 The tape drive of claim 22, wherein said servo controller derives a position error signal from said filtered servo signal and said servo controller uses said position error signal to control a position of said tape head relative to a tape.
- 25 The tape drive of claim 22, wherein said digital filter coefficients provide a matched digital filter for said tape velocity.
- 26 The tape drive of claim 22, wherein said digital filter is disabled during deceleration of a tape.
- 27 The tape drive of claim 22, wherein said digital filter is disabled during acceleration of a tape.
- 28 The tape drive of claim 22, further comprising;
  - a tape direction sensor, wherein said digital filter coefficients depend upon a tape direction obtained from said tape direction sensor.